

Spaceport News

John F. Kennedy Space Center - America's gateway to the universe



NASA file photos

Clockwise from top left: With NASA's Mars Science Laboratory (MSL) spacecraft sealed inside its payload fairing, the United Launch Alliance Atlas V rocket launches Nov. 26; VIPs sit in Orbiter Processing Facility-3 as NASA announced a partnership with Space Florida who in turn, made an agreement with the Boeing Company to manufacture and test the company's Crew Space Transportation (CST-100) spacecraft in the OPF; The mobile launcher sits on Launch Pad 39B for engineering tests in November; Astronauts and workers gather in front of space shuttle Atlantis at an employee appreciation event July 21 following landing of the final space shuttle mission, STS-135.

Looking back inspires outlook

By Allard Beutel
Spaceport News

In 2011, NASA's Kennedy Space Center helped launch a new era in space exploration, building on the final three missions of the Space Shuttle Program era.

Kennedy began transitioning from a historically government-only

launch facility, which supported shuttle missions and construction of the International Space Station, to a multi-purpose spaceport, supporting research and development aboard the space station and serving different types of missions, rockets, and spacecraft, both governmental and

See **REVIEW**, Page 2

Budget refines course of Commercial Crew Program

By Rebecca Regan
Spaceport News

NASA's Commercial Crew Program will move ahead using Space Act Agreements (SAAs) instead of contracts to advance designs of companies vying to launch astronauts into orbit. The move was made so the program could adapt to budget circumstances while maintaining a high level of competition.

"Our goal is to develop the best solutions, through competition, that the U.S. aerospace industry has to offer," said Ed Mango, CCP's program manager. "SAAs will do just that by allowing us to maintain more partners during the next phase of the program."

The framework of these agreements would allow NASA the flexibility to work with partners in adjusting the technical direction, milestones and funding for integrated capabilities.

The decision to move forward with SAAs was ironed out between NASA, Congress, and the White House's Office of Science and Technology Policy and Office of Management and Budget after the agency received less money than anticipated for its Fiscal Year 2012 budget.

"Contracts in a stable budget environment are very effective in

"CCP has the best development team NASA has ever put together for human spaceflight."

Ed Mango,
Manager,
Commercial Crew Program

reaching a critical design phase that meets NASA requirements," said Bill Gerstenmaier, associate administrator for NASA's Human Exploration and Operations Mission Directorate. "But in a dynamic budget environment, they can become difficult and costly to maintain. Space Acts won't allow us to move directly to certification, but they can allow industry to continue to advance their concepts."

SAAs are not a new way of doing business for CCP. In fact, the past two rounds of Commercial Crew Development (CCDev) activities have operated successfully under these arrangements.

"SAAs allow us to collaborate with our partners, provide technical insight, and freely exchange data and information," Mango said. "It's worked really well so far and should

See **CCP**, Page 2

Inside
this
issue...

Holiday Coffees



Pages 4-5

Model Makes Move



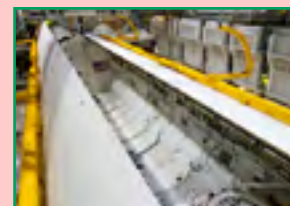
Page 6

Powered Down



Page 7

Payload Doors Close



Page 7

From **REVIEW**, Page 1

commercial.

As NASA's prime launch complex responsible for sending humans and payloads to space, Kennedy teams were involved in launching nine missions this year: six on expendable launch vehicles and the last three space shuttle flights ever.

The first of the final three shuttle flights started on Feb. 24 with Discovery's STS-133 mission roaring off Launch Pad 39A. The shuttle and its six astronauts delivered to the International Space Station the last pressurized U.S. segment called the Permanent Multipurpose Module. Discovery, the longest-serving veteran of NASA's space shuttle fleet, landed at Kennedy's Shuttle Landing Facility on March 9, completing a total of 39 missions since 1984.

Space shuttle Endeavour's final flight, the STS-134 mission, originally was scheduled to launch in late April. It was a high-profile launch, not only because it was the second to last shuttle mission, but because the wife of Endeavour Commander Mark Kelly, Arizona Representative Gabrielle Giffords, and President Obama and the first family were in attendance. But an electrical wiring issue kept Endeavour on Launch Pad 39A until May 16, when the shuttle and its six-astronaut crew lifted off to deliver the Alpha Magnetic Spectrometer-2 (AMS) and critical supplies to the space station. NASA's youngest shuttle returned to Kennedy on June 1, completing its 25th and final mission.

The last space shuttle flight, Atlantis' STS-135 mission, launched from Launch Pad 39A at 11:29 a.m. EDT on July 8 carrying the Raffaello multi-purpose logistics module full of supplies, experiments and key spare parts for the space station. On July 21 at 5:57 a.m., Atlantis touched down at Kennedy's Shuttle Landing Facility, concluding 30 years of



NASA/Frankie Martin

Space shuttles Endeavour and Discovery meet in a "nose-to-nose" photo opportunity as the vehicles switch locations Aug. 11. Discovery is undergoing preparations for public display at the Smithsonian's National Air and Space Museum Steven F. Udvar-Hazy Center in Virginia next spring. Endeavour is temporarily being stored in the Vehicle Assembly Building. In the second half of 2012, Endeavour will be delivered to the California Science Center in Los Angeles.

storied space shuttle missions. The Space Shuttle Program officially ended on Aug. 30.

And instead of preparing shuttles for space flights, technicians now are preparing them for public display. On April 12, the 30th anniversary of the first shuttle launch, NASA announced where the shuttles would be displayed: In 2012, NASA will deliver shuttle Discovery to the Smithsonian in Virginia; test shuttle Enterprise to the Intrepid Sea, Air and Space Museum in New York; and shuttle Endeavour to the California Science Center in Los Angeles. In early 2013, Atlantis, which is the only space shuttle NASA is retaining, will go to the Kennedy Space Center Visitor Complex.

NASA's Launch Services Program (LSP), which is based at Kennedy, had a rough start to its launch year. The Glory spacecraft failed to reach orbit after liftoff aboard an Orbital Sciences' Taurus XL rocket on March 4 from Vandenberg Air Force Base, Calif. A mishap board is investigating the failure; however, telemetry indicated the fairing, a protective shell atop the satellite's rocket, did not separate as expected. Glory was intended to improve scientists' understanding of how the sun and tiny atmospheric particles called aerosols affect Earth's climate.

On June 10, LSP was back on track with the launch of NASA's Aquarius/SAC-D observatory aboard a United Launch Alliance

Delta II rocket. The international satellite lifted off from Vandenberg Air Force Base carrying the agency-built Aquarius instrument that will measure the saltiness of Earth's oceans to advance our understanding of the global water cycle in order to improve climate forecasts.

LSP turned its attention to deep space with its next launch. On Aug. 5, NASA's Juno spacecraft launched atop a United Launch Alliance Atlas V rocket from Cape Canaveral Air Force Station, Fla., bound for Jupiter. After its five-year flight, Juno will look deep beneath the planet's swirling curtain of clouds to find out what lies beneath.

A United Launch Alliance Delta II rocket successfully sent NASA's twin moon-bound Gravity Recovery and Interior Laboratory (GRAIL) spacecraft on their way on Sept. 10. After arriving next week on New Year's weekend, the two solar-powered spacecraft will fly in tandem orbits around the moon to measure its gravity field and answer longstanding questions about the moon and how Earth and other rocky planets in the solar system formed.

On Oct. 28, a Delta II rocket sent the NPOESS Preparatory Project (NPP) spacecraft into Earth orbit from Vandenberg Air Force Base. NPP is the first NASA satellite mission to address the challenge of acquiring a wide range of land, ocean and atmospheric measurements for Earth system science while

simultaneously preparing to address operational requirements for weather forecasting.

LSP ended its 2011 launch schedule by sending the most sophisticated robotic explorer ever built to another planet. On Nov. 26, an Atlas V rocket launched NASA's Mars Science Laboratory (MSL), which carries a car-sized rover named Curiosity, from Cape Canaveral Air Force Station. Curiosity is scheduled to arrive at Mars in August 2012 and begin two years of study with its 10 science instruments to search for evidence about whether the Red Planet has had environments favorable for microbial life, including the chemical ingredients for life. The unique rover will use a laser to look inside rocks and release the gasses so that its spectrometer can analyze and send the data back to Earth.

While many Kennedy personnel were busy launching spacecraft and rockets in 2011, others were working on preparing to launch new spacecraft and rockets in the future. And with those new launch systems, new jobs will come to the Space Coast. On Sept. 14, NASA announced it had selected the design of a new Space Launch System (SLS) heavy-lift rocket that will send the agency's astronauts farther into space than ever before, such as to asteroids and Mars, and provide the cornerstone for America's future human space exploration efforts. The SLS with NASA's new Orion spacecraft, which already is under development, on top is set to lift off from Kennedy's Launch Pad 39B in 2017.

Deconstruction of pad 39B from being a space shuttle pad was completed in August, and now is being prepared for SLS and Orion and possibly commercial rockets and spacecraft. As part of that, a new comprehensive weather instrumentation system was installed there in

See **REVIEW**, Page 3

From **CCP**, Page 1

get us close to a critical design phase."

It's his team's ability to remain flexible and embrace change, Mango said, that will guarantee routine American access to the International Space Station and other

low Earth orbit destinations around the middle of the decade.

"CCP has one of the best development teams NASA has ever put together for human spaceflight," Mango said. "These folks want to be here, they want to do something different and

innovative, and everyone in this program tends to adapt to change quickly."

The announcement for proposals for these integrated capabilities is expected to be released in the first quarter of 2012.

These competitively awarded SAAs will be fol-

lowed by a competitively awarded contract for the certification phase, which will ensure that the designs fully meet the safety and performance requirements for a NASA mission.

"NASA is committed to ensuring that U.S. companies are sending American

astronauts into space," NASA Administrator Charles Bolden said. "This new acquisition strategy will allow us to preserve competition as we maintain our momentum to provide a U.S.-based commercial crew launch capability at the earliest possible time."

From **REVIEW**, Page 2

April providing up-to-the-second and extremely accurate measurements at several locations and altitudes. The improvements are expected to produce increasingly detailed launch criteria that could lead to more on-time liftoffs for a variety of rockets in the future.

SLS and Orion programs plan to use NASA's new mobile launcher (ML) to help start their voyages into deep space. Initial construction of the 355-foot-tall launch tower was completed in 2010. A year later, teams used a crawler-transporter to move the ML to Launch Pad 39B for two weeks of engineering tests in November. The data will help with the ML modifications needed to support the SLS and Orion.

As NASA's deep space human exploration program was taking shape in 2011, the parallel path of using commercial companies to bring cargo and then astronauts to the International Space Station also started picking up steam. NASA's new Commercial Crew Program (CCP) hit the ground running this year with the goal of assisting in the development of a United States-led commercial space system aiming to launch astronauts to the station and other future low Earth orbit destinations by about the middle of the decade. CCP is primarily based at Kennedy, which is a first for the center in NASA's human spaceflight programs.

CCP has had a busy inaugural year. In April, NASA awarded approximately \$270 million to four commercial companies to continue development of commercial rockets and spacecraft in the second phase of its Commercial Crew Development effort, known as CCDev2.

Also during the course of the year, CCP signed unfunded Space Act Agreements with three other companies under CCDev2. NASA will review and provide expert feedback to those companies on overall concepts and designs, systems requirements, launch vehicle compatibility, testing and integration plans, and operational and facilities plans.

In the last several years leading up to the Space Shuttle Program's retirement, Kennedy management has emphasized that partnering is the key to the center's future. In 2011, Kennedy's Center Planning and

Development Office was involved in discussions on about 80 agreements, many of which are partnerships with commercial companies. For example, in July, NASA and Sierra Nevada Corp., a CCDev2 company, entered into a Space Act Agreement that will offer the company technical capabilities from Kennedy's uniquely skilled work force. In August, a non-reimbursable umbrella agreement was signed between NASA and K.T. Engineering that aims to help the agency acquire the knowledge necessary to develop a multi-user ground system architecture for launching nontraditional, low-cost vehicles. And in October, NASA announced a partnership with Space Florida to occupy, use and modify Kennedy's Orbiter Processing Facility-3 (OPF-3), the Space Shuttle Main Engine Processing Facility and Processing Control Center. Space Florida, the aerospace economic development agency of the state of Florida, is leasing OPF-3 to The Boeing Company to manufacture and test the company's Crew Space Transportation (CST-100) spacecraft. In addition, Boeing, which also is a CCDev2 company, announced it is basing its Commercial Crew Program headquarters at Kennedy.

Even with U.S. construction of the

International Space Station complete, support for the orbiting facility from Kennedy received a boost on Sept. 9. The Center for the Advancement of Science in Space (CASIS) was awarded management of the portion of the station that is operated as a U.S. national laboratory. CASIS will base its efforts at the Space Life Sciences Laboratory at Kennedy and help ensure the station's unique capabilities are made available to the broadest possible cross-section of U.S. scientific, technological and industrial communities.

In August, Kennedy formed the Ground Processing Directorate to support operations management, as well as strategies and techniques to launch a variety of rockets and spacecraft from Kennedy in the future. Ground Processing represents Kennedy's efforts to become less program-centric and more capability-centric to provide technical services to diverse government and non-government customers.

Cooperation and partnerships were key themes discussed on Oct. 18 when Florida Gov. Rick Scott, Lt. Gov. Jennifer Carroll and cabinet members toured Kennedy's Operations and Checkout Building, where final assembly of NASA's Orion spacecraft will take place.

Gov. Scott expressed a desire to find new projects and initiatives in the coming years in which Florida and NASA could work together.

Kennedy also continued expanding its green efforts in 2011. In January, the center unveiled its newest environmentally friendly building, the Propellants North Administrative and Maintenance Facility. Propellants North qualified for the U.S. Green Building Council's Leadership in Energy and Environmental Design, or LEED, Platinum status, which is the highest of green building certifications. As expected, throughout the year the facility produced more of its own energy that it used.

In November, Kennedy also hosted the third forum in the LAUNCH initiative, which is designed to identify and support innovative work that will contribute to a sustainable future. Like the two previous forums, which also were held at Kennedy, NASA along with the other founder partners, the U.S. Agency for International Development, the U.S. State Department and Nike, brought experts together to focus on a sustainability topic. In this year's case it was "energy."

On May 5, more than 200 workers from the original Mercury Program joined NASA senior management on Cape Canaveral Air Force Station for a re-creation of Alan Shepard's flight and recovery to commemorate the 50th anniversary of the first U.S. manned spaceflight.

And in the summer of 2012, NASA's Kennedy Space Center will celebrate its own 50th anniversary. As the United States begins this new approach to human spaceflight, using commercial and government methods of exploring space, Kennedy aims to continue to play an integral role in NASA's and America's scientific research and discoveries for the next half century and beyond.



NASA/Jim Grossmann

Kennedy Space Center Director Bob Cabana (right) briefs Florida Gov. Rick Scott (left) on the Orion Multi-Purpose Crew Vehicle on Oct. 18 in the Operations and Checkout Building at Kennedy Space Center. In the background is an Orion mock-up used for testing.

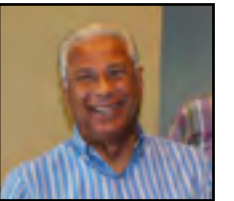
More online

For more information about NASA's Kennedy Space Center and the missions and programs it supports, visit:
www.nasa.gov/kennedy

For more 2011 Year in Review photos, go to
<http://mediaarchive.ksc.nasa.gov/search.cfm?cat=249>

2011 KSC Holiday Coffees

NASA civil service and contractor employees enjoy refreshments and other goodies at the 32nd annual KSC Holiday Coffees on Dec. 13 in the Operations and Checkout Building's Mission Briefing Room (bottom left) and the lobby of the Operations Support Building II (bottom right).



Good plan makes ease of high-fidelity model move

By Steven Siceloff
Spaceport News

It takes a lot to move a space shuttle, even if it's a full-sized model. Moving the high-fidelity shuttle model from the Kennedy Space Center Visitor Complex on Dec. 11 called for an array of planning, a specialized trailer and about 100 people. It also called for the temporary removal of 18 light poles, four traffic signals and some street signs.

It took the team about five hours to make the six-mile trip from the visitor complex to the turn basin across the street from NASA Kennedy Space Center's Vehicle Assembly Building. The group started rolling at 7:30 a.m. on that Sunday so they wouldn't have to worry about traveling in the dark or blocking too much traffic.

Some of the workers were on hand during the move in case more signs or other hardware had to be removed as the model made its way through the center.

The shuttle model took a different route than normal traffic, including going the "wrong way" on an entrance ramp to avoid going beneath the bridge over Kennedy Parkway. With tour buses and other vehicles detoured to the opposite side of the roadway, the model moved north in the southbound lane.



NASA/Dimitri Gerondidakis

The transporter carrying the high-fidelity space shuttle model on display at the NASA Kennedy Space Center Visitor Complex rolls onto the roadway at the visitor complex to begin its move to the Launch Complex 39 turn basin. The shuttle was part of a display at the visitor complex that also included an external tank and two solid rocket boosters. The move also helps clear the way for the visitor complex to begin construction of a new facility next year to display space shuttle Atlantis in 2013. For more information about the visitor complex and its plans, click on the photo.

Beyel Bros., a heavy lifting and hauling contractor, used a specialized trailer that had lifts built in, along with 144 wheels that could turn and swivel so the trailer could move nearly sideways if needed.

The model's convoy never traveled more than about 6 mph. It came to a stop many times along the way so the trailer's built-in jacks could raise or lower the wings to get past obstacles such as guard shacks and traffic lights.

"There were four or five really hard spots," said Gerald "Jay" Green, project manager for the move.

But then, moving space shuttles and full-scale model shuttles has always required extra consideration. For instance, crews moving a space shuttle through the mountains in California had to cut slots in the rock to make room for the wings.

Moving the model didn't require such an extreme action, but it took a month of planning and considerable study of potential routes. Even 3-D computer modeling was used to find problem zones. All this was before Green and his group found out they would have to move the model with the wings attached.

The first plans called for the wings to be cut off, but that decision changed, forcing Green to model for a wingspan of 78 feet rather than the relatively narrow fuselage.

"We had to redo the plan in about a week," Green said. "We knew we would eventually have to take Atlantis, so we had to figure out what would make it work."

The tightest fit came when the wings passed within six inches of a railroad crossing sign.

The model, which weighs some 130,000 pounds, almost the same as a real shuttle, is outfitted with doors, and people toured inside it for years at the visitor complex.

"You can go in it, which I think is a great thing," Green said. "It's going somewhere where it's going to be used and enjoyed."

The model is expected to remain at the turn basin until February, when it will be taken on an open barge to Texas for display at Space Center Houston, the visitor center for NASA's Johnson Space Center.

"It went very well," said Green. "I felt a great sense of accomplishment when we got it done."

A similar move will be made early in 2013 when space shuttle Atlantis is expected to be taken in the opposite direction to its display location at the visitor complex.



NASA/Dimitri Gerondidakis

The high-fidelity space shuttle model, which was on display at the NASA Kennedy Space Center Visitor Complex, rolls through the parking lot leading to Kennedy's Launch Complex 39 turn basin on Dec. 11. Behind it are the 525-foot-tall Vehicle Assembly Building and the Launch Control Center. The model will stay at the turn basin for a few months until it is ready to be transported to Texas via barge. For more information about Space Center Houston, click on the photo.

Discovery powers down one final time



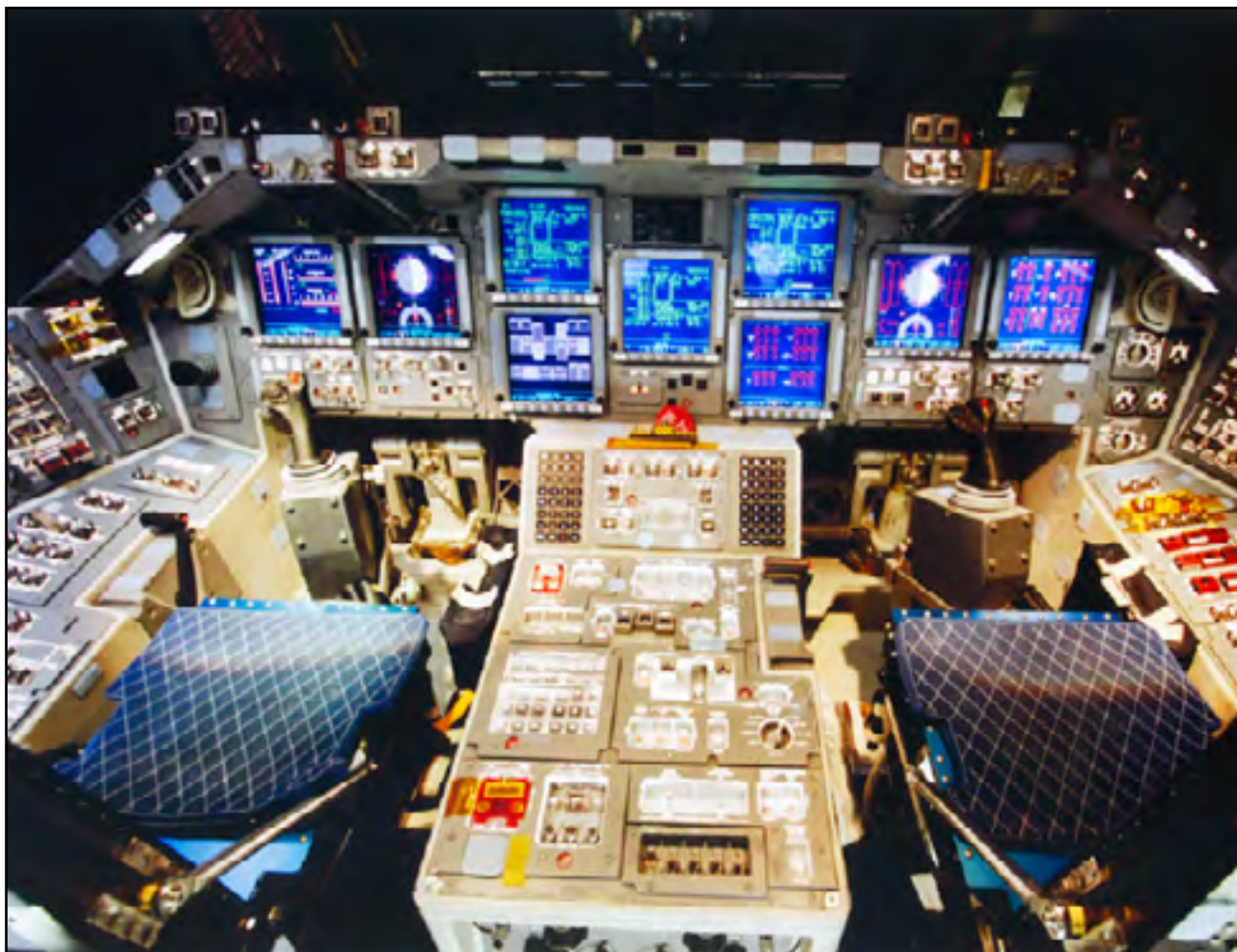
NASA/Jim Grossmann

Space shuttle support personnel in Orbiter Processing Facility-1 prepare to power down space shuttle Discovery for the last time on Dec. 16.



NASA/Jim Grossmann

In Orbiter Processing Facility-1, Kennedy Space Center Director Bob Cabana participates in the final power down of space shuttle Discovery on Dec. 16.



NASA/Jim Grossmann

The flight deck of space shuttle Discovery is brightly illuminated for the last time Dec. 16 in Orbiter Processing Facility-1.

Discovery's payload bay doors close for last time

A series of photos shows the yellow-painted strongbacks closing space shuttle Discovery's payload bay doors for the final time during Space Shuttle Program transition and retirement activities on Dec. 16 in Orbiter Processing Facility-1. Discovery was first powered up Feb. 28, 1983. Strongbacks are used to support and operate the doors when the shuttle is not in space. Discovery is being prepared for public display at the Smithsonian's National Air and Space Museum Steven F. Udvar-Hazy Center in Chantilly, Va., in 2012.



Photos by NASA/Kim Shiflett

WORD ON THE STREET

With 2011 nearly behind us, what are you looking forward to most in 2012?



"I'm really looking forward to many more jobs here and ultimately a healthy year for my family."

Judy Clontz,
Abacus Technology Corp.



"To making the nearly 1,000,000 export determinations that will close out the Space Shuttle Program."

Melanie Chan,
NASA



"To the new opportunities that will arise with the new commercial ventures. Exciting stuff lies ahead."

Bob Moore,
Millennium Engineering and Integration Co.



"I hope that everyone who is facing challenges in their life are able to find peace."

Sharon Barker,
NASA Exchange



"It's a lot of fun to look forward to all the interesting things that will be going on here at Kennedy."

Christopher Vance,
Science Applications International Corp.



"To actually see new programs get off the ground. I'm chomping at the bit to get this started. Let's go!"

A.J. Neal,
ManTech International Corp.



"We're getting close to retirement so selling my house and downsizing. I hope to stay in Brevard County."

Pam Hill,
Abacus Technology Corp.

Spaceport News returns in 2012

This is the final issue of Spaceport News in 2011.
View the next edition on Jan. 13, 2012.

Looking up and ahead . . .

* Launch windows to be determined in 2012

2012

No Earlier Than Jan. 19	Launch/CCAFA (SLC-37B): Delta IV, WGS 4 Launch window: TBD
Targeted for Feb. 7	Launch/CCAFA (SLC-40): SpaceX Falcon 9, Dragon C2/C3 Launch window: TBD
No Earlier Than Feb. 16	Launch/CCAFA (SLC-41): Atlas V, MUOS Launch window: TBD
No Earlier Than March 14	Launch/Kwajalein Atoll: Pegasus XL, NuSTAR Launch window: TBD
No Earlier Than April 27	Launch/CCAFA (SLC-41): Atlas V, AEHF 2 Launch window: TBD
June	Launch/CCAFA (SLC-37B): Delta IV-Heavy, NROL-15 Launch window: TBD
No Earlier Than Aug. 23	Launch/CCAFA (LC-41): Atlas V-401, RBSP Launch window: TBD
No Earlier Than September	Launch/CCAFA (LC-37B): Delta 4, GPS 2F-3 Launch window: TBD
Dec. 1	Launch/VAFB: Pegasus XL, Interface Region Imaging Spectrograph (IRIS) Launch window: TBD
No Earlier Than Dec. 1	Launch/CCAFA (LC-41): Atlas V, Tracking and Data Relay Satellite-K (TDRS-K) Launch window: TBD



John F. Kennedy Space Center

Spaceport News

Spaceport News is an official publication of the Kennedy Space Center and is published online on alternate Fridays by Public Affairs in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted three weeks before publication to Public Affairs, IMCS-440. E-mail submissions can be sent to KSC-Spaceport-News@mail.nasa.gov

Managing editor Candrea Thomas
Editor Frank Ochoa-Gonzales
Copy editor Kay Grinter

Editorial support provided by Abacus Technology Corp. Writers Group.

NASA at KSC is on the Internet at www.nasa.gov/kennedy

USGPO: 733-049/600142

Spaceport News wishes you and yours a safe and happy holiday season!